

Fertilizer Products – Possibilities and Impossibilities

Rigas Karamanos

***In times of change, learners inherit
the Earth, while the learned find
themselves beautifully equipped to
deal with a world that no longer
exists***

Eric Hoffer

New Technology – How will it Affect Your farm?

- [Excerpts 1997 Future Technology - North Battleford.ppt](#)

One of the major hurdles in bringing “new” products to market is the fact that most of the manipulation of the yield is taking place on the upper part of the yield curve, where proportional increases or differences often become a statistical nightmare to prove!

- 50 bu/acre canola
- 3 bu/acre yield increase (6% yield increase)
- Experiment: 10 treatments and 6 reps
- CV is 10%
- Need to separate differences at 80% level of certainty

26 replicates

- 50 bu/acre canola
- 3 bu/acre yield increase (6% yield increase)
- Experiment: 10 treatments and 6 reps
- CV is 10%
- Need to separate differences at 95% level of certainty

76 replicates



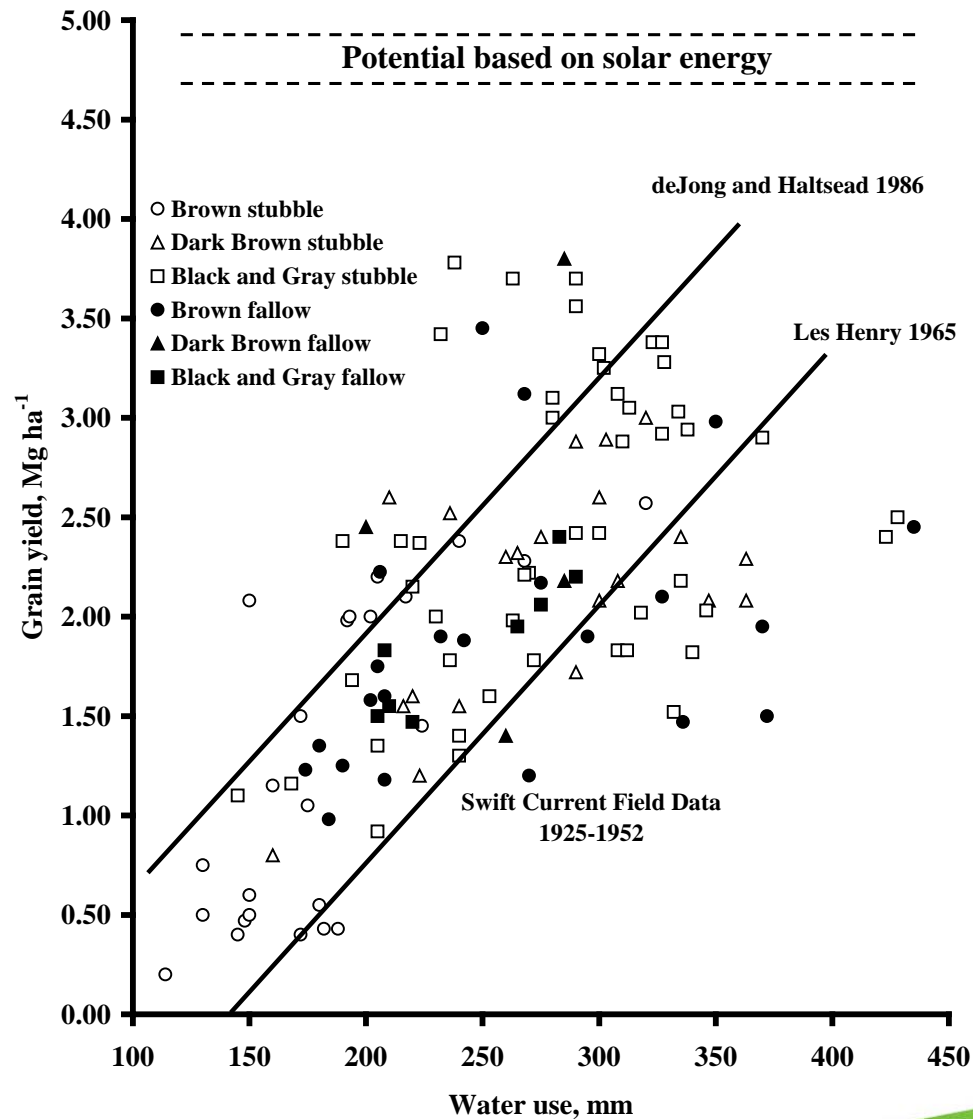
Today a producer looks for:

- **Innovations in agriculture**
- **Anything that would give them an advantage**

What determines Maximum Yield?

- **Crop genetics**
- **Solar radiation**
- **WATER**
- **Nutrients**

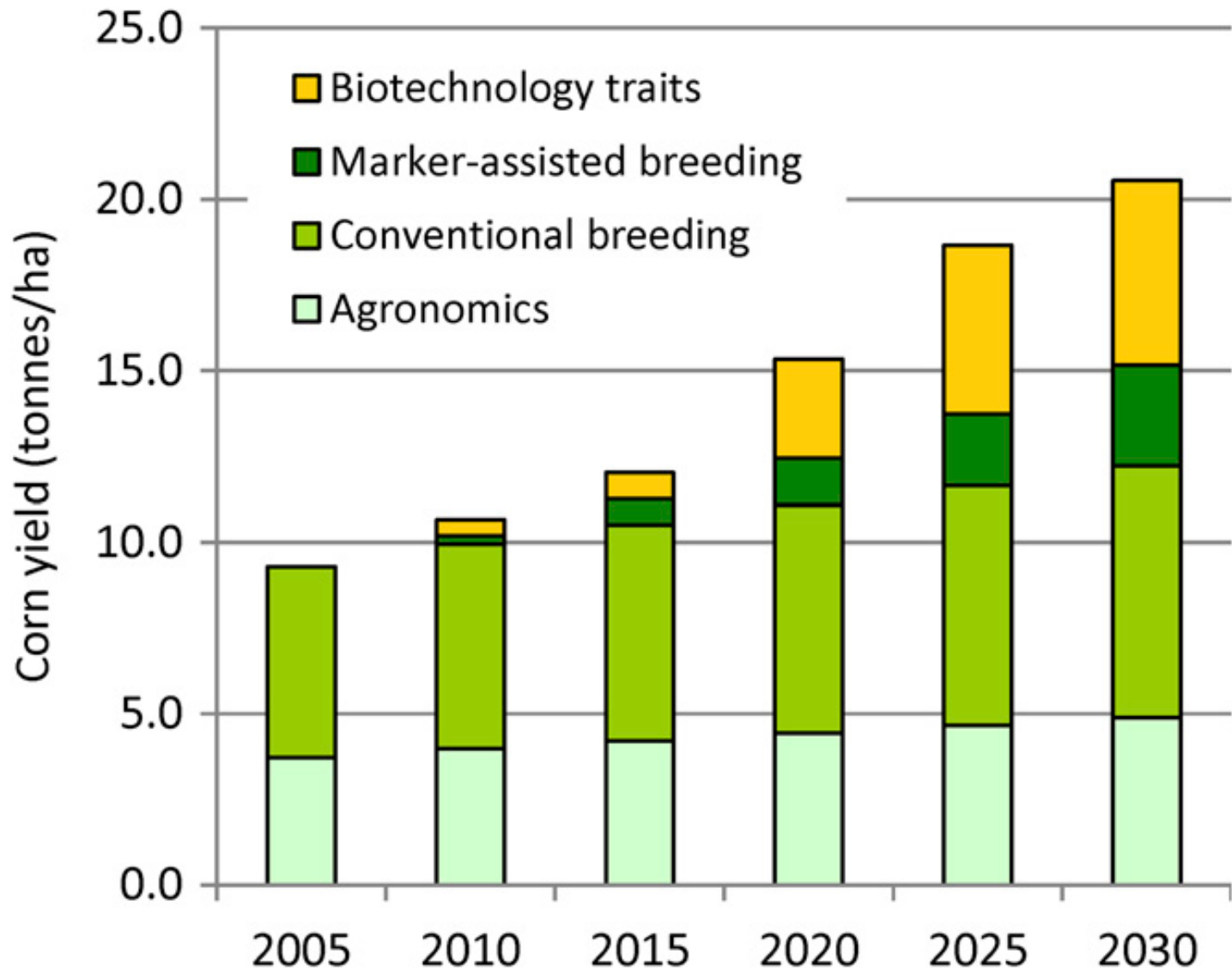
Great example from the eighties



Increasing Crop Productivity to Meet Global Needs for Feed, Food, and Fuel

Michael D. Edgerton

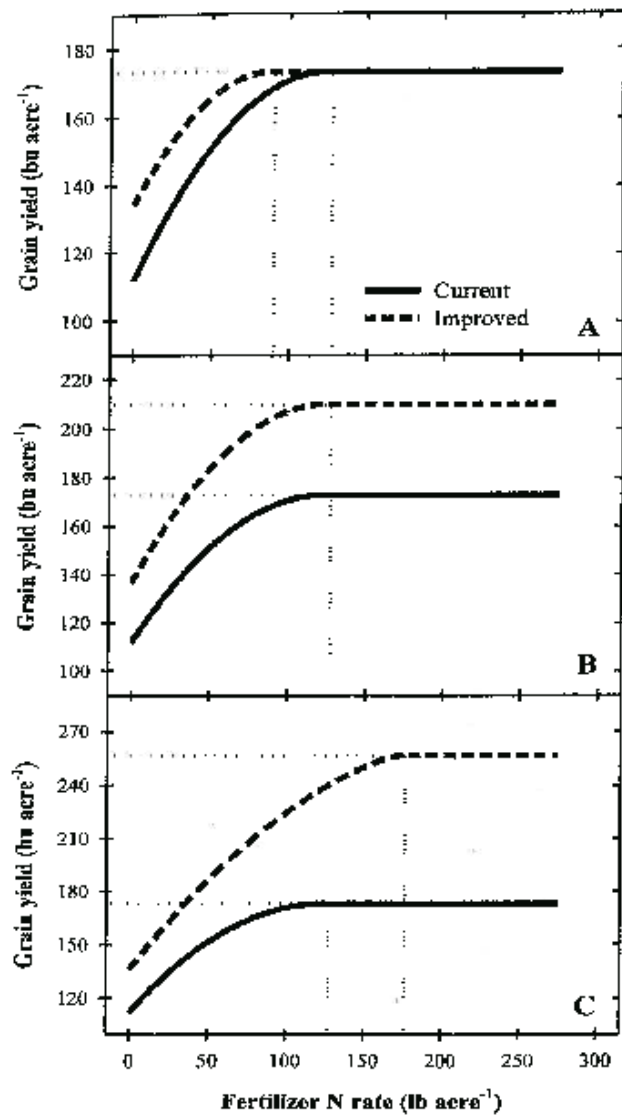
[Edgerton 2009.pdf](#)



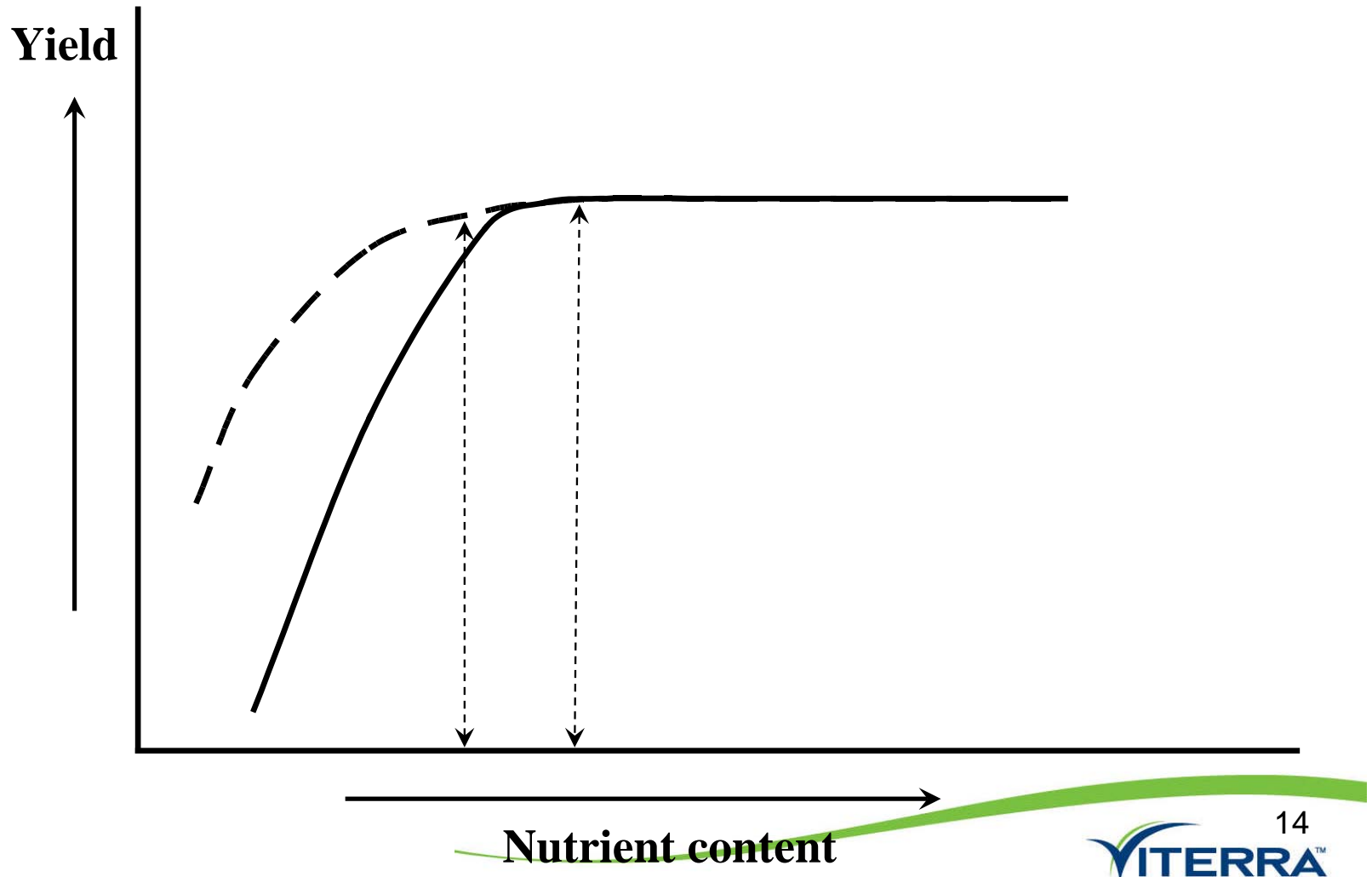
How to improve N use?

Below et al. 2007

(University of Illinois)

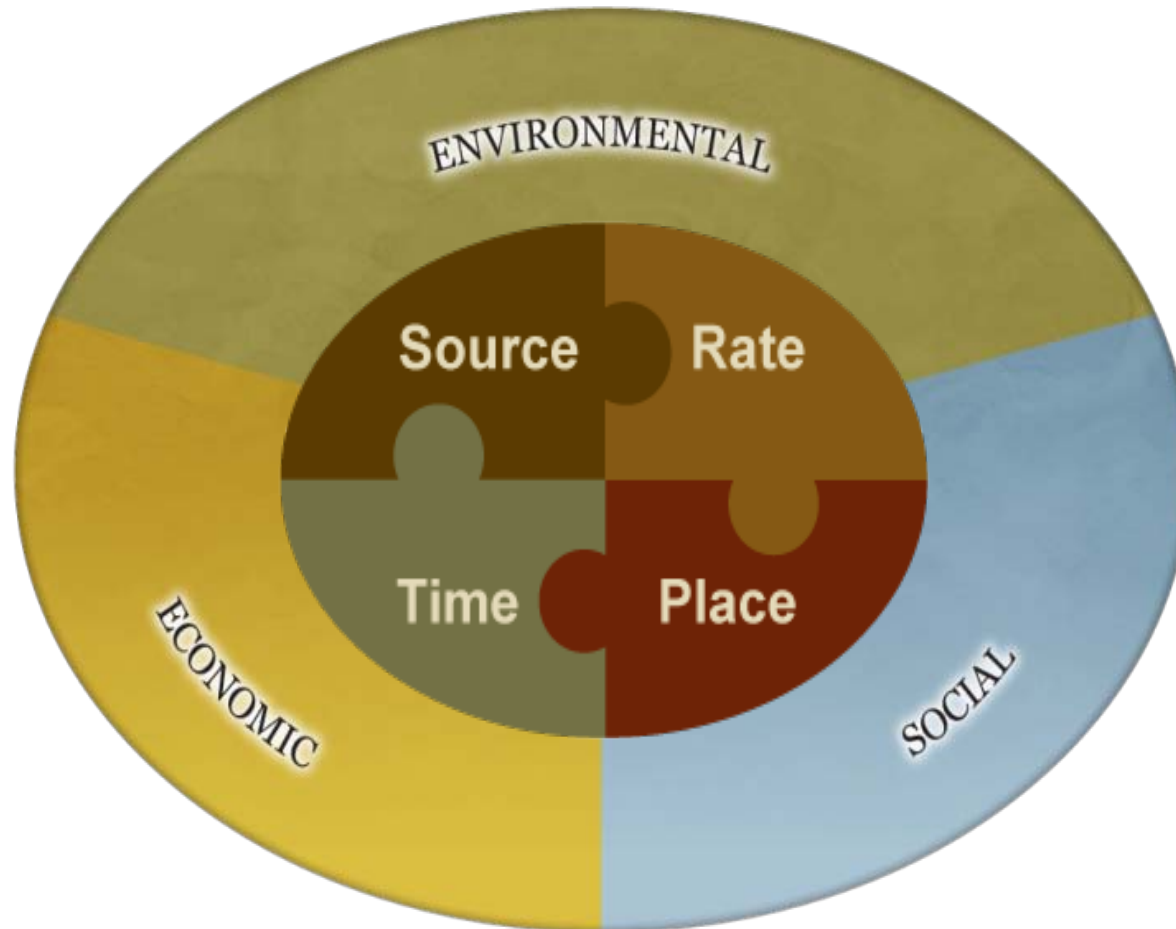


Scenario A: Similar yields with less fertilizer

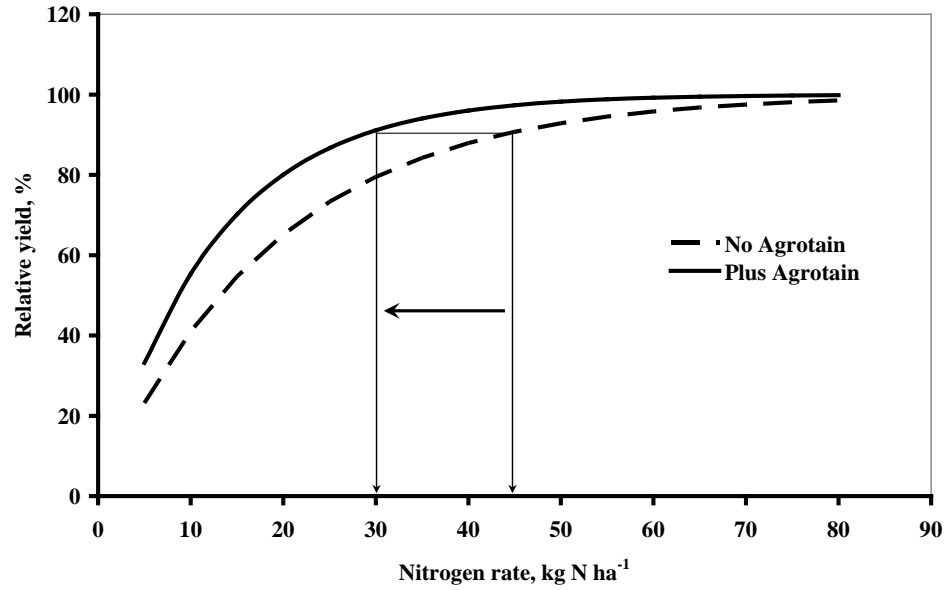


4R Nutrient Stewardship

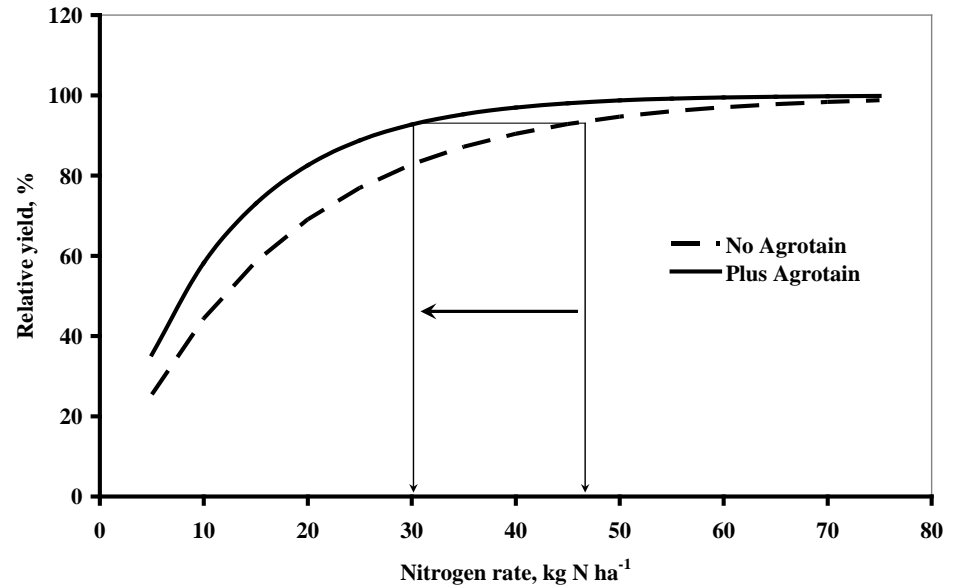
- Right Source @ Right Rate, Right Time & Right Place
 - Linking practices to science for sustainability performance



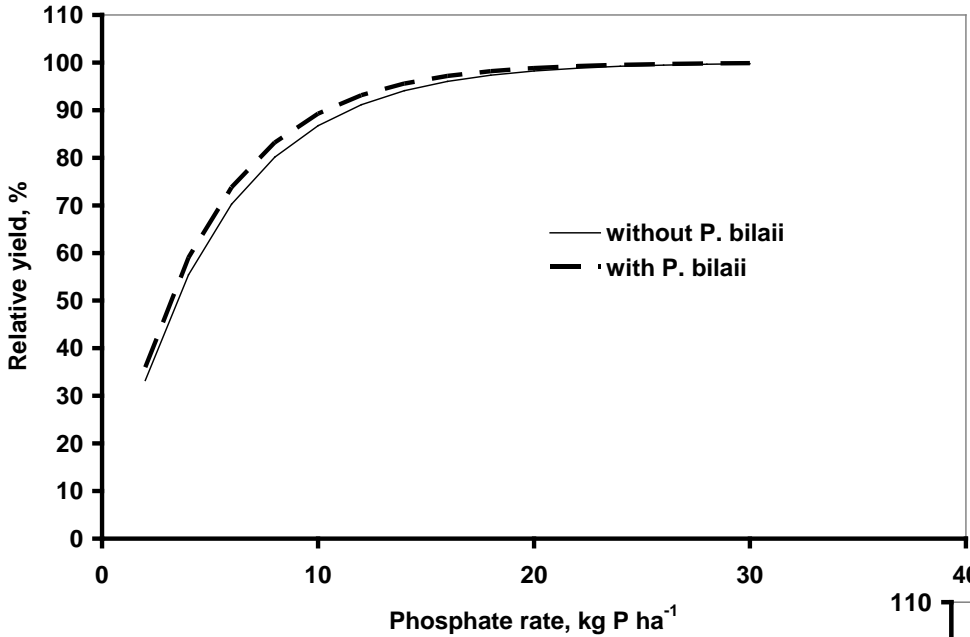
Wheat (14 trials)



Barley (18 trials)



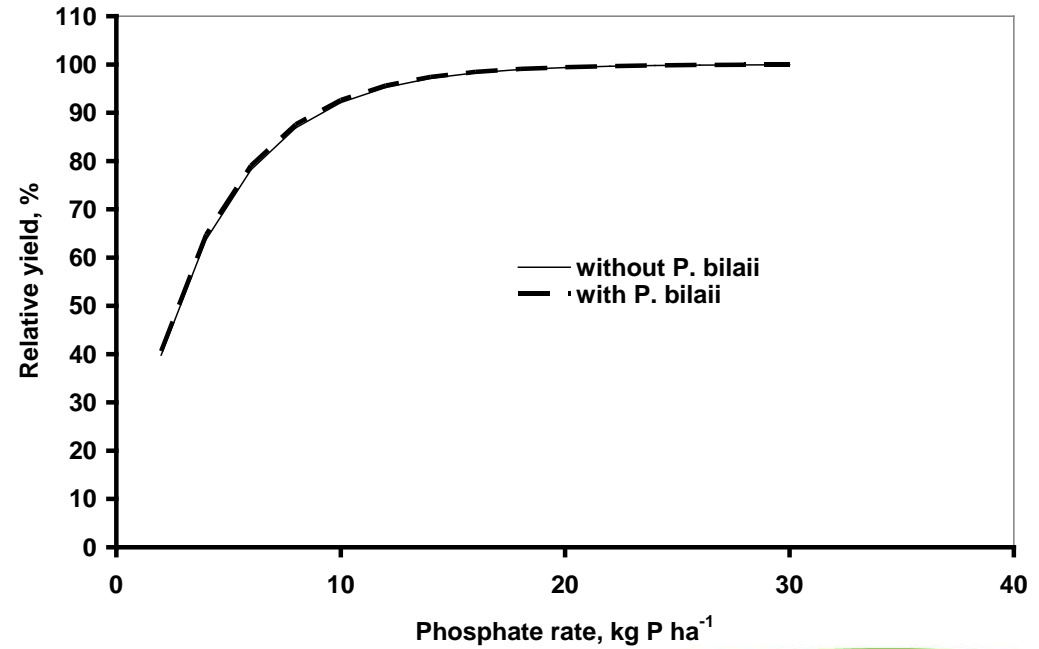
(a)



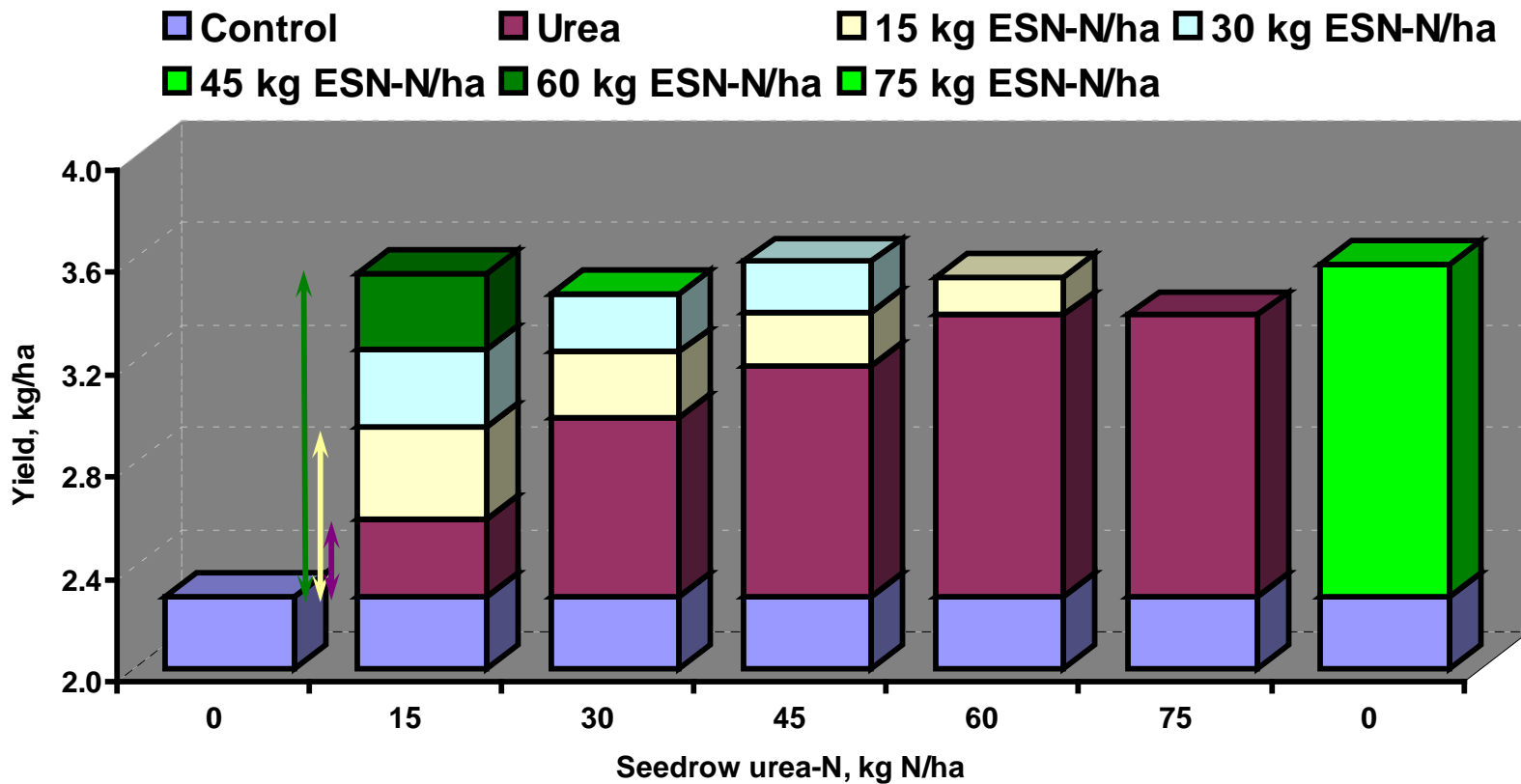
Barley (20 trials)

Wheat (47 trials)

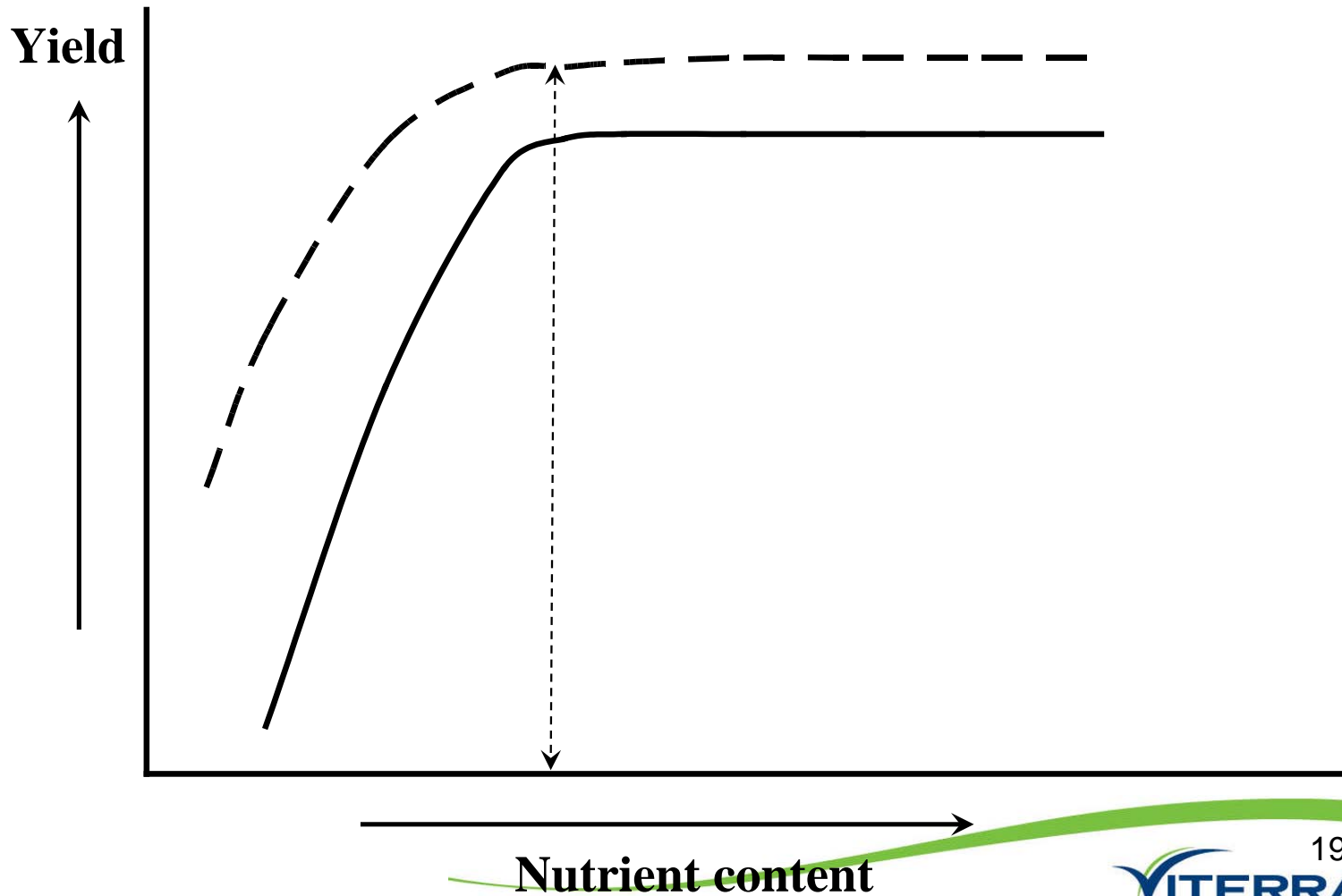
(b)



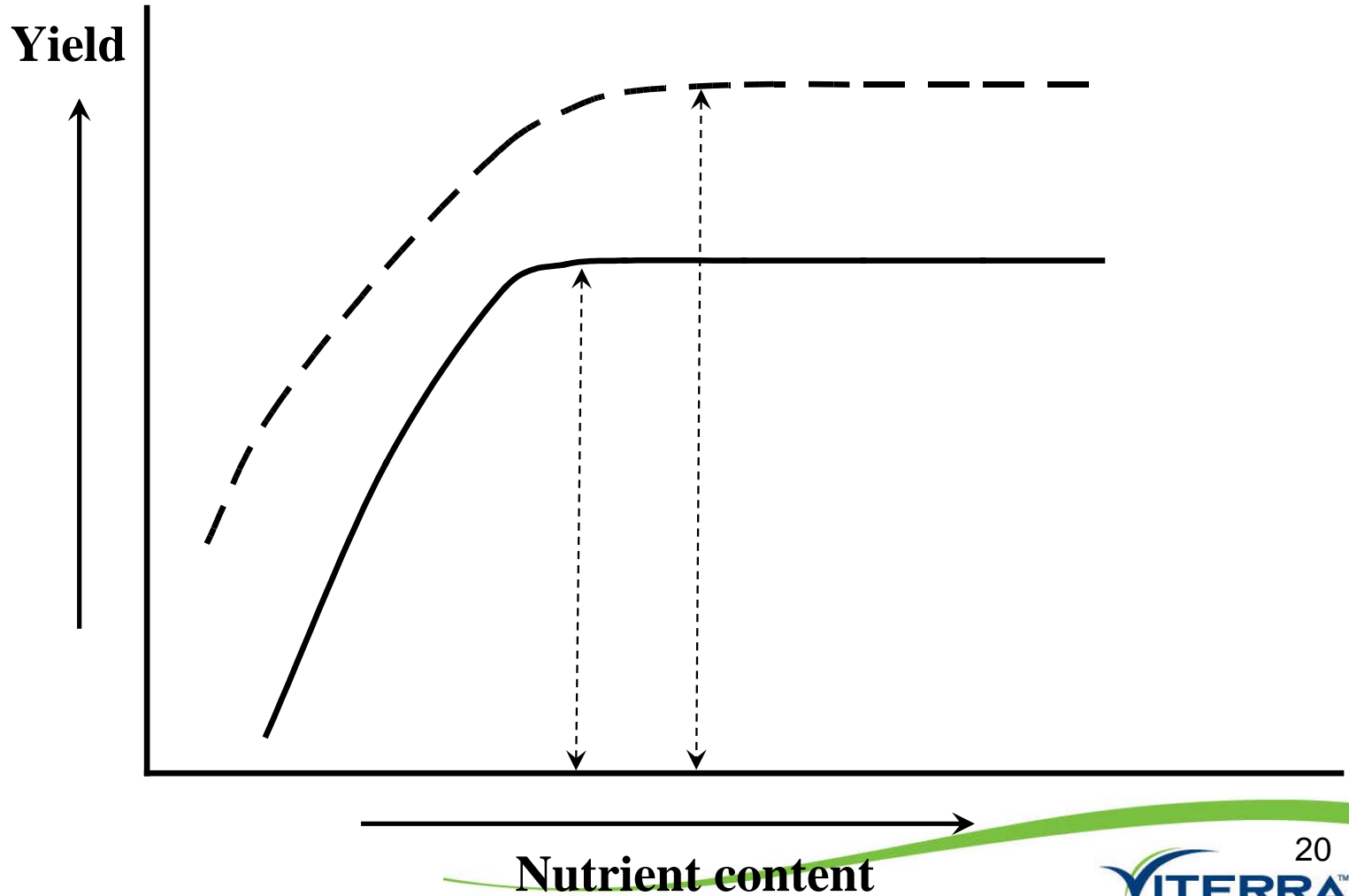
Seedrow Placement – Wheat Replacing BMP's



Scenario B: Higher yields with the same level of fertilizer



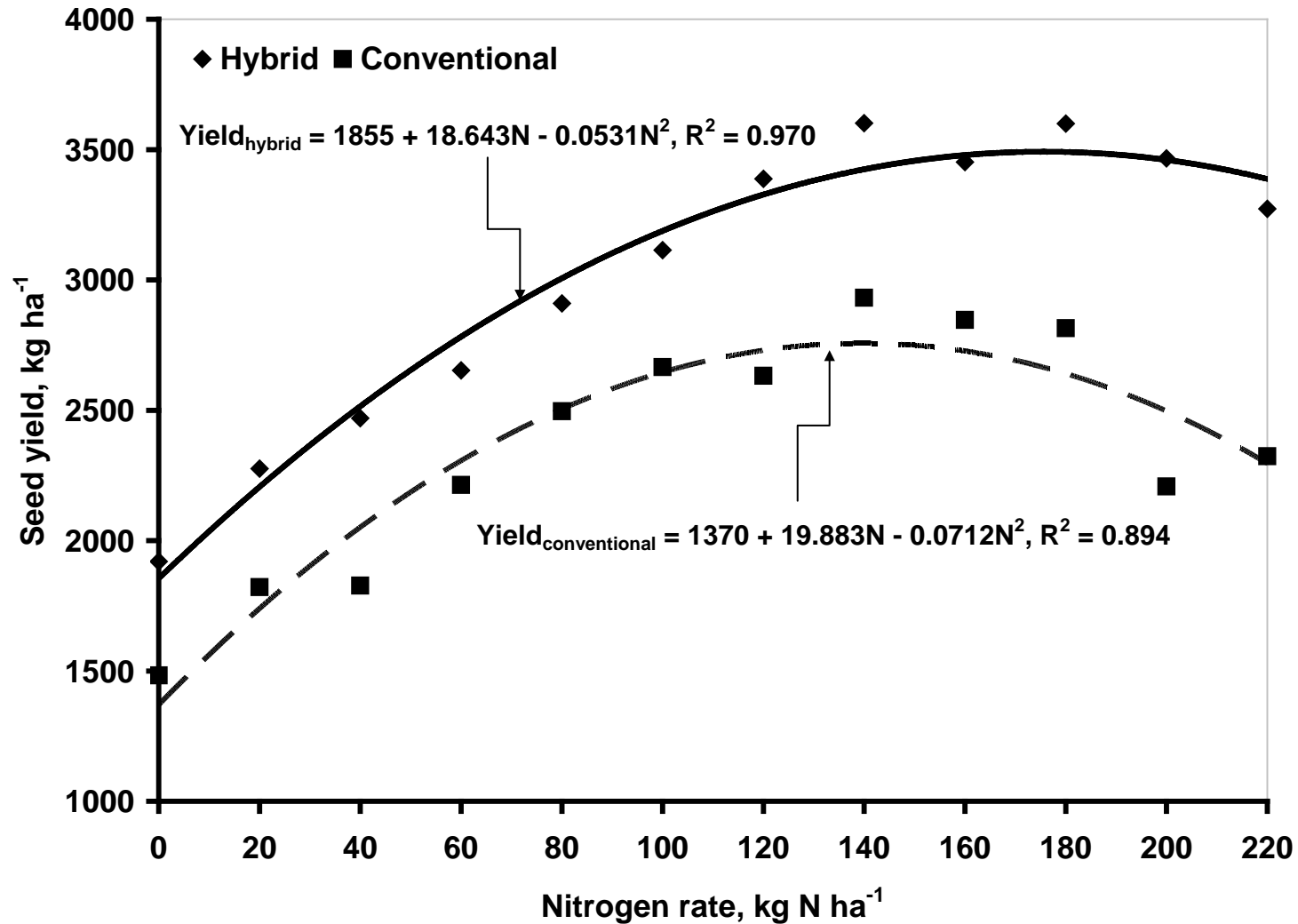
Scenario C: Higher yields both at low and high Nutrient content



How are these scenarios achieved?

- **Below et al. (2007): Through improvement of NUE with improved genetics and biotechnology!**

Canola hybrids



Karamanos et al. (2005)

Define what “works” means to you!

- **Greener the next day?**
- **Higher nutrient concentration in leaves?**
- **Better than the neighbor's?**
- **Better than last year?**
- **Logical?**

Types of Operating Costs

- ✱ Essential: Seed.
- ✱ Enhancement: **Fertilizer**, Seed.
- ✱ Maintenance: **Fertilizer**, Herbicide.
- ✱ Protection: Herbicide, Insecticide, Fungicide.
- ✱ Insurance: Herbicide, Insecticide, Fungicide, **Fertilizer**.

Define what “works” means to you!

***Two inputs that offer Enhancement:
Fertilizer, Seed**

These two will pay the bills!

- **Minimum \$2:\$1 return**

Good

- A “good” product provides both agronomic and economic benefits to producers. Its behaviour is predictable within reason and its application is supported by ample scientific evidence. It mostly meets the criteria of type “a” response.

Bad

- A “bad” product is one that provides sporadic agronomic and economic benefits to producers, so much so that those can be considered random events. Its behaviour is not well understood and the body of scientific research is limited. It mostly meets the criteria of type “b” response.

Ugly

- **An “ugly” product offers no benefits of any sort to the producer, just to the person that peddles it! It can be considered a “miracle” product. Normally, the market takes care of it, unfortunately though at the expense of a few producers, who have the desire to find new opportunities. It meets no particular criteria!**

New treatment (\$5.50/ac) helps canola (\$8/bu) beat the weather

Location	Yield, bu/acre		Yield increase		
	Control	Treated	bu/acre	%	Δ\$Y/1\$
Red Deer	47.2	47.9	0.6	1.3	\$0.9
Wetaskiwin	50.3	50.6	0.2	0.4	\$0.3
Herronton	11	10.9	-0.1	-1.2	-\$0.2
Herronton	10.3	12.2	1.9	18.4	\$2.8
Balzac	33.8	35.5	1.7	5	\$2.5
Balzac	33.2	33.5	0.4	1.2	\$0.6
Choicelend	42	41.5	-0.5	-1.2	-\$0.7
Elm Creek	17.6	25.5	8	45.5	\$11.6
Miami	26.9	31.2	4.3	16	\$6.3
Average	30.3	32.1	1.9	9.6	\$2.8

New treatment (\$5.50/ac) helps canola (\$8/bu) beat the weather

Location	Yield, bu/acre		Yield increase		Δ \$Y/1\$
	Control	Treated	bu/acre	%	
Red Deer	47.2	47.9	0	0	\$0
Wetaskiwin	50.3	50.6	0	0	\$0
Herronton	11	10.9	0	0	\$0
Herronton	10.3	12.2	1.9	18.4	\$2.8
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Elm Creek	17.6	25.5	8	45.5	\$11.6
Miami	26.9	31.2	0	0	\$0
Average	30.3	32.1	1.1	7.1	\$1.6

Any Idea what the \$5.50 per acre treatment was?

- The size of the plots was 160 square feet



- Convert to 1 acre ($43,560 \div 160 = 275$)
- $2¢ \times 275 = \$5.50$